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EXPLANATION OF THE PLATES.

Plate 1.—Mantel-Piece in Rosso di Levante with Appliqué Bronze Ornament; from the design of Ihne and Stegmüller executed by M. L. Schleicher in Berlin.

Plate 2.—Jewelry; from the design of O. Girard manufactured by J. Bacher and Markowitsch and Scheid in Vienne.

Plate 3.—Specimens of Surface Decoration, designed by Eisenlohr and Weigle, Architects in Stuttgart.

Plate 4.—Ewer in Silver Cast and Gilt by Odiot, Goldsmith in Paris.

Plate 5.—Richly carved Book-Case in Italian Walnut for a Gentleman's Study; from the design of Ihne and Stegmüller executed by E. Langer, Cabinet-Maker in Schweidnitz.

Plate 6.—Panel from the Communion Table in the Cathedral of Verdun, wrought in one piece and repoussé on both sides by A. G. Moreau, Art-Metal Worker in Paris.

Plate 7.—Cover of a Majolica Dish, middle of 16th century.

VARIOUS.

American Glass Making.

The first glass factory in America was erected in 1609 near Jamestown, Va., and the second followed in the same colony twelve years later. In 1639 some acres of ground were granted to glassmen in Salem, Mass., probably the first year of the industrie which was prosecuted there for many years. The first glass factory in Pennsylvania was built near Philadelphia in 1683, under the direction of Wm. Penn, but it did not prove successful. The first glass factory west of the Alleghenies was set up by Albert Gallatin and his associates in 1785, at New Geneva, on the Monongahela River. A small factory was established on the Ohio River, near Pittsburg, in 1790, and another in 1795. The earlier attempt failed, the later was quite successful. In 1810 there were twenty-two glass factories in the country, with an annual product valued at $ 1,047,000. There are now about five times as many factories, producing eight times as much glass. According to the returns received under the recent census, our flint-glass factories turn out 210,554 tons of table and other glassware; and the window-glass works produce 2,644,440 boxes. The total value of the product is nearly $ 45,750,000.

Scientific American.

Improved Preparation of Carmine.

It is often difficult to obtain a pure bright carmine, even with the best cochineal. It is known that Guatemala contains over 16, Java 7, Canary cochineal 18 per cent stearoptine or crystallisable fat. T. T. Hess has brought an improvement in the preparation, which consists in eliminating the fatty substance by means of alcohol, the color obtained is then purer and brighter than otherwise. *The Furniture Gazette.*

Natural Silver Plating.

A curious instance of natural silver-plating is reported from the Lord of Lorne Mine, of the American Flat section, Nevada. The sides next to the veins and the hanging walls of the ledge are covered with a thin coating of natural plating of pure silver as smooth as glass. The vein itself is narrow, and is being prospected by means of a tunnel. The superintendent says this peculiar feature of the inclosing walls is observable so far as the tunnel has followed the ledge. The ore of the vein itself is of a soft, easily-worked nature, showing considerable chloride as well as sulphurets, yet not giving very high assays. The filmy deposit of silver on the walls was evidently condensed and forcibly deposited there under immense pressure, as it has a smooth, burnished appearance. *Scientific American.*

Iridescent Glass.

One of the principal Paris manufacturers of iridescent glass is M. L. Clémanpot, who invented and patented the process of producing iridescent effects on glass by the reaction upon it of divers chemical agents under pressure and at a high temperature. Under the name of glass, M. Clémanpot includes all substances resulting from the fusion of silica, which acts as an acid with bases, such as potash, soda, lime, oxyde of lead, and the like. In submitting one of these compounds—*e. g.,* glass with a base of potash, soda, lime, or lead—to the action of the different acids, and under a pressure of from thirty to seventy pounds per square inch, iridescent, nacreous, or similar effects, resulting from the decomposition of the glass, are obtained. If, among other reactions, under a pressure of from thirty to seventy pounds, water acidulated with hydrochloric acid in the proportion of fifteen per cent of acid is employed, nacreous and iridescent effects resembling those of ordinary mother-of-pearl, or nacre, are obtained. It is said that the same effect can be produced without pressure. The applications of this process are numerous, and include the production of nacre, the manufacture of pearls and opals, imitations of antique glass, and similar work. *The Furniture Gazette.*

Ancient Metal Work.

An interesting find of ancient tombs, supposed to have formed part of a Burgundian burying-ground, was made a short time ago at Assens, a village of Canton Vaud. These tombs, which follow each other in regular order, are hollowed out of the rock on a hill at the entrance of the village, about 3 ft. below the soil. They are each 2 metres long and 80 centimetres wide. Among the objects found are pieces of curiously-wrought and chased metal an silver rivets, the remains, probably, of a warrior's glaive and sword-belt. In another of the tombs was a bell-mouthed vase of the capacity of half a litre, black as to its exterior, but in substance yellow. Whether the material of which it is composed be stone or burnt earth has not been determined. Inside as well as outside there are traces of lozenge-shaped figures, executed apparently with some graving tool. The chief interest of these tombs consists in the fact that they are almost certainly coeval with the arrival of the Burgundians in the Jura country in the fifth century, whither they were called by the aboriginal inhabitants to repeople the land, almost depopulated by an invasion of the Alemanni.

The Furniture Gazette.

Calico Printing in France.

At the end of last year there were in France 30 printworks, with 70 machines, of which there were in Rouen—Deville (S. Inférieure), 8 works, with 18 machines; Maromme, 2, 7 machines; Darnetal, 1, 2 machines; St. Aubin, 2, 6 machines; Le Houlme, 1, 5 machines; Lescoure, 1, 6 machines; Bolbec, 1, 4 machines. Paris—Puteaux, 2, 8 machines; La Glacière, 1, 4 machines; St. Denis, 1, 3 machines; Claye, 1, 4 machines; Hericourt, 1, 1 machine; Villefranche, 1, 2 machines; Amiens, 1, 2 machines; Bourgoing, 1, 1 machine; Toulouse, 2, 2 machines; Thaon, 1, 2 machines; Valenciennes, 1, 1 machine; Vizille, 1, 2 machines. Of these, one work only had 6 printing machines, 3 had 4 each, 5 had 3 each, 4 had 2 each, 6 had 1 each, and 2 had no machine at all. Of the above, 14 were one-color machines, 3 two-color, 13 three-color, 27 four-color, 2 five-color, 5 eight-color, and 1 twelve-color.

The Furniture Gazette.

Rendering Pencil Drawings Permanent.

A very thin aqueous solution of gum arabic is serviceable for preventing the rubbing off of the pencilling without spoiling the drawings. Thin collodion (plain) does very well; or white of egg dissolved in dilute ammonia water by agitation with broken glass. *The Furniture Gazette.*

Treatment of Nickel with Phosphorus.

M. J. Garnier, of the French Academy of Sciences, recently presented the following interesting paper to that body, giving the results of his experiments with nickel:

Pure nickel after melting generally contains more or less oxygen, and the metal is brittle. To prevent this injurious action of the oxygen, it is necessary to incorporate with the molten nickel a substance which has a great affinity for oxygen, but which shall also have a great affinity for the nickel itself; furthermore, this substance must not make the nickel brittle. The injurious action of the oxygen is proven by the fact that pure nickel melted in an atmosphere free from oxygen is extremely malleable. Such is the case with that which is accidentally deposited on the nozzles of the furnace blowers surrounded by combustible material. This same nickel, remelted or simply brought into contact with the air while at red heat, may then be pulverized under the hammer. Satisfied of this fact since 1876, I thought of adding metallic manganese to the metal, as is done in making steel. I chose manganese as the proper combining substance on account of its low price in the state of ferromanganese; but other easily oxydizable metals, it is needless to say, would have given the same results.

The manganese, it is true, did improve the quality of the nickel; but, like all metals having a great affinity for oxygen, it disappeared after successive remeltings, leaving the nickel again brittle. Thus I found that the oxydizable metals would not serve my purpose in practice, and I then employed phosphorus with success.

Besides the advantage of not perceptibly diminishing in remelting, when used in the small quantity necessary, phosphorus absorbs a much greater quantity of oxygen than any metal that can be used for the same purpose, using equal weights; thus while one unit of phosphorus absorbs 1·25 of oxygen in passing into phosphoric acid and 1·50 in passing into simple phosphate, one unit of manganese will absorb only 0·30 of oxygen in becoming protoxyde of manganese; one unit of zinc will take only 0·25 of oxygen, and one unit of magnesium only 0·66 of oxygen. Furthermore, the phosphorus acts on the metal in such a way as to give it the various qualities necessary for its use in the arts, and its effect upon nickel may be compared with that of carbon upon iron. Thus up to three thousandths of phosphorus the nickel is soft and very malleable; beyond this amount its hardness increases at the expense of its malleability.

One of the means which I use to incorporate the phosphorus with the nickel is to add to the molten metal, in the desired proportion, a phosphite of nickel containing about six per cent of phosphorus. I obtain this phosphite by melting a mixture of phosphate of lime, silica, carbon, and nickel. This phosphite is white, hard, and brittle.

I have easily beaten out both cold and hot nickel containing 0·0025 of phosphorus, obtaining without difficulty sheets of two thousandths of an inch in thickness, that is to say, as thin as they could be made without beating out *en paquets,* and there is every reason to expect even better results. I have noticed that the first blow of the laminator brings out all the defects of an ingot, but that hardly any others show themselves during the remainder of the work, the reverse of what happens with *maillechort* (a kind of alloy resembling German silver); it is, therefore, very important to have ingots very free from defects.

Phosphorized nickel, united with brass, zinc, and iron, has given me results very greatly superior to those obtained with non-phosphorized nickel; the ingots were more perfect, since the phosphorus in absorbing the oxygen in the mass of the metal produced a solid and not gaseous compound. Thanks to phosphorus I have been able to unite nickel and iron in all proportions, always obtaining a soft and malleable alloy. This explains why some distinguished chemists have contradicted each other as to the malleability of nickel and iron united, some alleging that that alloy was brittle, and others that it was malleable; these latter used phosphorous iron.

Scientific American.